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United States Department of Agriculture | Forest Service | Region 5

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Reply to: 3430 Evaluation

Date: December 4, 1980

Subject: Crystal Lake Recreation Area, Post-Suppression Evaluation

To: Forest Supervisor, Angeles NF

At the request of the Mt. Baldy Ranger District, Forest Pest Management pathologist John Kliejunas and entomologist John Pierce conducted a post-suppression evaluation of the dwarf mistletoe control project in the Crystal Lake Recreation Area on November 12, 1980. The objective was to determine if the guildlines for witches' broom removal, as stated in the project proposal, were followed. While in the area, two other problems -- annosus root disease and the risk of Armillaria root disease spread -- were evaluated and discussed.

DWARF MISTLETOE CONTROL PROJECT

The second phase of the broom pruning project was completed by the District on October 6, 1980. The project was examined along with District Ranger Don Stickers, Resource Officer Max Copenhagen and Project Forester Richard Hawkins. A final post-suppression evaluation of the project is planned by the District in 1988 to determine if long-term treatment objectives were achieved; namely 1) an overall increase in stand vigor, 2) an overall decrease of stand mortality, 3) an increase of individual tree vigor, and 4) a prolonged life of individual trees.

Points specifically looked at during this inspection were: 1) removal of dwarf mistletoe brooms, 2) leaving 30% live crown, and 3) determining if treated trees were threatened by other pest problems such as annosus root disease or bark beetles, which would negate the positive effects of broom pruning.

All criteria set down in the project proposal were followed and no serious problems were noted.

The truck used for broom pruning was unable to reach all the trees selected for treatment. The treatment of trees selected for ground pruning has not been completed. There are also additional trees in the Crystal Lake Basin which would benefit from broom pruning. It is recommended that these remaining infected trees be broom-pruned so as to complete this control project for all of the Crystal Lake Recreation Area and prevent the local build-up of bark beetles and the tree mortality that results.

The District plans for complete slash disposal by firewood cutters. Only very light attacks by pine engraver beetles, Ips spp., and the western pine beetle, Dendroctonus brevicomis, now exist in the green slash and no significant buildup is likely under current conditions. Green slash created late in the season is less hazardous than cutting in the spring or early summer.

Tree #140, which died after pruning, was killed by the western pine beetle. However, this tree may have been under attack at about the time it was pruned last May and the treatment was not likely responsible for causing the beetle infestation.

Copies of notes taken on the trees in the project and a map of their locations will be sent to the Regional Office. We suggest that treated trees be retagged below the ground line to preserve their identity in the campground setting. FPM pathologists may periodically reinspect the trees to accumulate data for comparison with other broom pruning projects. We note in passing that of the 308 trees originally selected for treatment in 1978, 13 died before treatment could be applied in 1980. Since treatment, only one tree has died and it was probably attacked by beetles before or during treatment. The Forest should contact R-5 FPM prior to the 1988 post-treatment evaluation to schedule a joint review.

District personnel involved with the work should be commended for their competent handling of the project.

Those involved with the project are now familiar with pruning work, are confident treated trees will increase in vigor, and feel that additional trees in the Crystal Lake Recreation Area would benefit from broom pruning. Additional FPM funds for dwarf mistletoe control are available if the District wishes to expand on the original proposal.

ANNOSUS ROOT DISEASE, CRYSTAL LAKE CAMPGROUND

Richard Hawkins, Project Forester on the Mt. Baldy RD, suspected the presence of annosus root disease centers at three locations in the Crystal Lake Campground. Because these sites are scheduled for planting, the District requested that FPM determine if annosus root disease was present and, if it was, to train District personnel in its recognition.

Annosus root disease was identified at two of the three sites: on the hill south of the main campground parking lot, and in the open area north of the amphitheater. It was not found in the flood plain in the vicinity of the Racoon - Cougar sections of the campground.

Because of the interest expressed, a systematic survey of approximately the southern one-half of the campground for Fomes annosus was done on November 14. Time available was not adequate to survey the entire campground. Conks of F. annosus were found on 1) two additional stumps in the Fawnskin picnic area north of the Amphitheater, 2) two stumps at site #82, 3) one stump at site #71, 4) two stumps at site #54, and 5) one stump at site #231. No conks of F. annosus were found in the Middle and Upper Chipmunk areas, but resin-soaked wood from roots taken from a stump at site #210 was infected. Armillaria mellea was found on one stump south of site #84 in the Towhee area, and on one stump south of site #54 in the Robin area.

FPM will complete the annosus root disease survey of the campground, including the Deer Flats area and the area in the vicinity of the Crystal Lake Work Center, map the root disease centers found, and discuss possible management alternatives in relation to other pests present.

ARMILLARIA ROOT ROT

District personnel inquired as to the probabilities of shoestring root rot, or Armillaria root disease, caused by Armillaria mellea, spreading from canyon live oaks to an adjacent plantation of Coulter pines. The plantation is separated from the oaks by a 20 to 30-foot-wide fireline, and an additional fuelbreak is being constructed by cutting the oaks on the margin of the line.

Armillaria mellea is a fungus which causes a root and root collar decay of more than 600 species of conifers, hardwoods, shrubs and herbaceous plants. After the fungus has developed in an infected tree, it uses the dead stump or root as a food base to produce structures called rhizomorphs. Rhizomorphs formed on decayed wood grow through the soil and may infect living trees in the vicinity, especially young conifers. When the rhizomorph contacts a susceptible root, it adheres and penetrates through the bark to the cambium region. The fungus grows in the cambial area and produces a creamy white, flat leathery, fan-shaped mycelial mat. A network of rhizomorphs is often associated with the mat. From the mats the fungus penetrates xylem tissue and produces a white to yellowish stringy rot that is often accompanied by fine black zone lines.

Armillaria mellea is present in most forest stands and is usually prevalent where oak is a stand component. Although the fungus exists in most soils, vigorous, healthy oaks are able to resist rhizomorph penetration. Death or decreased vigor of oaks allows the fungus to penetrate, decay tissues, and form rhizomorphs. Oak stumps provide a food base for A. mellea. This food base is essential for the production and growth of rhizomorphs through the soil. Therefore, the presence or creation of dead oak roots/stumps increases the probability of infection of conifers in the immediate vicinity of the oak roots by the rhizomorphs. Oak stumps and roots heavily-infected with A. mellea act as spread centers as long as they provide a suitable food base for the rhizomorphs.

The rate at which the fungus penetrates and colonizes dying roots of oaks, and subsequently produces rhizomorphs for spread to surrounding conifers, is influenced by the method that the oak is killed. A dying root loses resistance to invasion by the fungus. Consequently, the longer the root remains alive, the longer it can resist the fungus. Killing of oak trees by girdling or by herbicide treatment results in rapid colonization and increased rhizomorph production because host resistance is lost quickly.

Decreasing the amount of dead oak roots or stumps present at any one time will decrease the food base available for rhizomorph production and reduce the risk of subsequent spread from the food base via rhizomorphs to surrounding conifers. Cutting back of oaks in a manner which allows or induces sprouting will decrease the food base available; the fungus will not be able to use the living roots as a food base for rhizomorph production. Small stumps (less than 4 inches) are not likely to cause much mortality unless they are very dense in a given area. Treating oaks so that they decline

gradually rather than rapidly will also reduce the amount of food base available at any one time. If oaks are old and declining naturally, allowing them to continue declining slowly would decrease the risk of Armillaria buildup.

Since canyon live oak is a vigorous sprouter, and since the pines in the plantation are separated from the oaks by a distance of 20 feet or more, there will be little or no risk of Armillaria spreading into the plantation.

If there are any questions concerning this evaluation, or if further information on applying for FPM dwarf mistletoe control funds is needed, contact me or my staff, (415) 556-6864.

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